Using Problem-Based Learning for the acquisition of psychological knowledge and understanding

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This paper describes the introduction of Problem-Based Learning (PBL) into a final-year option module in psychology. The background and rationale for the changes introduced are discussed and the experience of PBL is considered from the point of view of tutor and students. The introduction of PBL considerably increased student attainment in the module and enhanced the module experience for students and for the tutor. It is suggested that PBL can be an effective vehicle for enabling students to acquire knowledge and critical understanding of psychology and that this can be assessed effectively using traditional methods that focus on outcomes rather than processes.

Keywords: *Problem-Based Learning; PBL; student performance; learning; knowledge.*

THIS ARTICLE describes the introduction of Problem-Based Learning (PBL) into a final-year option module in a psychology programme. The particular focus is on introducing PBL in order to enhance student learning and critical understanding of psychology and on this forming the basis for the assessment. The module and the reasons for change will be outlined and some detailed consideration of PBL and its underlying principles will be given to make clear the types of issues that need to be explored if PBL is to be considered as a teaching and learning method in psychology. This will, hopefully, be informative to those unfamiliar with PBL as well as to those already using PBL with its more traditional focus on assessment of the learning process.

The module, its context and rationale for change

Psychology and Advertising is a Level 6 option module offered to students on psychology programmes at Leeds Trinity University. As is standard at Leeds Trinity, the module was originally designed as a 20-credit module to be delivered across two semesters, with one assessment point in each semester. The forms of assessment that were used were an unseen examination in Semester 1 and a research report in Semester 2, based on a small-scale research project, conducted individually or in pairs. Broadly, the content of the module was divided so that Semester 1 focused on the application of cognitive psychological concepts to advertising, especially the measurement of the memorability and effectiveness of advertising, and Semester 2 focused on social psychological aspects of advertising (e.g. gender representations, issues of advertising to children).

This is not a professional training module, and students opt to take it out of interest in the subject matter; the content is not, and is not intended to be, vocational. This is an applied psychology module that uses the phenomena of advertising as a vehicle, rather than a module about advertising or marketing practices.

As the module has consisted of small-group teaching (in the first four years of the module's life, beginning in 2007, student numbers fluctuated between 12 and 25), there has been opportunity to deliver short lectures and then use the remaining part of the weekly 90-minute session to engage the students with a range of activities. These largely consisted of students being given a choice of journal articles to read, or having to research one of their own, and co-ordinating

their efforts to collate the information and produce a summary, often in the form of notes on a flip-chart combined with an informal presentation or a group discussion.

These more active parts of the sessions suffered from the problems with small groups so well articulated by Ramsden (2003): students did not prepare effectively for the sessions, some students could not be encouraged to talk, and the students wanted to be given the 'answer' rather than build up a picture for themselves. As Ramsden points out, there is a tendency in higher education for small group work to be viewed as a 'supplement' to the lecture rather than of a valuable learning activity in its own right, and I found that students wanted me to give longer lectures rather than have them actively participate. Student-led activities were viewed as the 'poor relation' to the lecture, and this was exacerbated by two factors: firstly, much of the teaching that the students had experienced on their programme up to this point had been largely lecture based. All modules had large-group lectures, and any other form of teaching and learning activity was relatively rare. Secondly, the inclusion of short lecture-style delivery in Psychology and Advertising was providing the opportunity for students to contrast the lectures with the active learning elements. Students could see the difference between my doing all the work, and them having to do some, and they naturally preferred the model that they were used to in which they were able to take a passive role in learning. In fact, during the sessions, students often commented that they would have preferred just to have a longer lecture on the topic, and this was reflected in module evaluation responses in which students commented that more lectures and fewer group activities would be preferable.

A strategic approach to learning was also evident in terms of students using lecture notes to 'revise' for exams, and the group work being perceived as less useful in this regard. There was some comment that more extensive lectures would have provided a better foundation for the exam, as the existing lectures did not 'give all the information for the exam'.

Importantly, student performance on the assessments for the module was disappointing. The essays produced in the exam were becoming increasingly shallow half-remembered renditions of lecture materials, and the product of a reluctant and partial engagement with the group discussion tasks. In short, there was little evidence that learning was taking place at anything but the most strategic (Biggs, 1987) or even surface of levels (Marton, 1975; Marton & Säljö, 1984). Student performance in terms of grades was also quite variable, but tended to average, overall, in the mid 2.2 range (i.e. around 55 per cent) on both assessments.

I decided that a radical change of approach was needed to enhance the student learning experience and student achievement, as well as my own satisfaction with the module and its outcomes.

I aimed to develop a learning environment for students that was engaging and inspiring and which helped them to develop confidence in their own learning. I also wanted students to undertake collaborative learning and to reap the benefits of sharing their learning with others. I felt it important to develop a module experience that students would not only enjoy and rate positively, as in previous years, but which led to positive assessment outcomes that reflected the culmination of an authentic learning process.

Problem-Based Learning

Problem-Based Learning (PBL) is a student-centred approach to learning that was developed in the 1960s as a method of training medical students in diagnosis and other clinically relevant skills (e.g. Barrows & Tamblyn, 1980). Its initial emphasis was to shift away from 'problem-solving' approaches in which students are provided with information by a lecturer and then try to apply the information that they have been 'taught' to a range of tasks. The problem-

solving approach is reflected in a great deal of current teaching and learning activity in psychology in UK universities; students are 'taught' information via a series of lectures, and then apply that information in order to address specific issues, most typically to write an essay using the lecturer-provided information as a starting point and guide.

In contrast, PBL focuses on students being provided with complex, 'real-world' problems that have no single 'correct' answer. Working in groups, students analyse the 'problem', identify the key issues, consider what information they need to seek and how to find it, and apply their acquired knowledge and information to producing a 'solution' to the problem.

PBL is claimed to produce better-motivated students, to develop a deeper understanding of the subject, to encourage independent and collaborative learning, to develop higher-order cognitive skills, and to develop a range of transferable skills, including problem solving, group working, critical analysis and communication (Hughes & Overton, 2009). Further, students following PBL courses tend to be more likely to adopt 'deep' approaches to learning (e.g. Albanese & Mitchell, 1993).

Interestingly, PBL has been found to have particular benefits for the long-term retention of learning (e.g. Dochy et al., 2003; Strobel & van Barneveld, 2009) and for the development of critical thinking skills (e.g. Hmelo, 1998). Further, de Graaff and Kolmos (2003) report that 'it is a very common experience that students are more motivated and work much harder with the PBL model than with traditional teaching methods. They also spend a great deal of time on PBL work' (p.660).

It is important to appreciate the relationship between PBL and Enquiry-Based Learning (EBL). EBL can be defined as 'a broad umbrella term used to describe approaches to learning that are driven by a process of enquiry' (O'Rourke & Kahn, 2005, p.1). This can include a wide variety of approaches such as small-scale investigations or project work in which students are given a task by the tutor and are then required to identify their learning needs and pursue their own lines of enquiry. Although, as O'Neill and Moore (2008) point out, EBL and PBL are often used interchangeably in the literature, PBL is often presented as a sub-domain of EBL. Barrett (2005) argues that the main defining features of PBL include: (1) the problem being presented to students first at the start of the learning process; and (2) students in PBL tutorials defining their own learning issues, what they need to research, and taking responsibility for searching for appropriate sources of information. Two further important distinctions are that PBL always involves group work (O'Neill & Moore, 2008), while EBL can involve students working alone, and that PBL follows a systematic process, such as the 'Seven Steps' to PBL (Schmidt & Bouhijs, 1980; Schmidt, 1983; Schultz & Christensen, 2004; Nuutila, Törmä & Malmi, 2005), described later.

Generally speaking, the scenarios presented to students to initiate the learning process in PBL tend to have goals that are a little more defined and less open-ended than those used in other forms of EBL.

Regardless, however, of whether the activity is labelled as EBL or PBL, this is 'teaching as making learning possible', as opposed to 'teaching as telling' or 'teaching as organising' (Ramsden, 2003) and this is the main purpose of employing this approach.

Introduction of PBL to the module

The module structure was modified so that, while remaining a 20-credit module, it was to be delivered in a single semester. This would allow for longer weekly (three hour) sessions to allow students to engage with activities effectively and to have sufficient time to develop their approaches, allocate tasks, discuss findings, and present outcomes.

Although, as discussed above, PBL has numerous benefits, there are also some challenges and potential disadvantages. For

example, one of the key defining characteristics in PBL is the role of the tutor as a 'facilitator' rather than as a guardian and source of subject knowledge, and 'the path from lecturer to facilitator is often an uneasy one' (Little, 1997, p.121). There are significant challenges, too, for students. As Little (1997) points out, the reality of PBL may be too much in conflict with students' habits and expectations of learning. After some consideration, I decided that the best way to tackle this would be to explain the purposes of PBL and forewarn the students that they may experience uncertainty or even a feeling of 'bereavement' at the loss of lectures. This also informed my decision that a 'hybrid' PBL combining PBL with other forms of learning may be counter-productive and that a 'pure' PBL experience would better enable students to engage with PBL and focus less on alternative modes of teaching and learning. As the module is an option module, students would have ample information to decide whether or not the module was suited to their needs at the outset.

Further, Hughes and Overton (2009) point out some distinct disadvantages of a wholly PBL approach within the experimental sciences: (1) The content is reduced compared to the amount that can be covered in lecture-based courses; and (2) PBL takes more staff time because the group sizes have to be restricted and strategies have to be put in place to ensure inclusive group working.

I was not particularly concerned that students must cover a huge breadth of material in the module. I was not training students to be clinical psychologists, doctors, or engineers, wherein a gap or narrowness in their knowledge would have critical implications. In previous years, although I had lectured on a wide range of topics, I was not convinced that this meant that students had 'covered' them all in any meaningful way. Although students would be covering fewer areas (I decided on four), they would, hopefully, be covering them in more depth and more actively. They would genuinely learn something about a few areas and, in doing so, would be able to demonstrate that they had the knowledge, understanding and analytical skills appropriate to a psychology graduate. They would also have benefited from working as a group and co-ordinating their efforts: all key employability skills.

As the module had, in the main, attracted a small group of students, the shift to PBL did not seem too problematic in this regard. Hutchings and O'Rourke (2006) describe a final-year module in literary studies that employed a similar enquiry-based learning approach. In their module, students attended weekly two-hour sessions in groups of 10 to 18 students and were then sub-divided into small groups of four or five students. Students were positive about the learning experience and Hutchings and O'Rourke report that 'The extraordinary achievement of this… can be measured by the way in which process and product answered, in one fell swoop, virtually the entire list of criteria defined in the Quality Assurance Agency for Higher Education's benchmarking statement for English' (p.15).

Preparing the 'problems'

In terms of module content and sequencing, all groups were to begin with the same problem to establish their engagement with PBL (and, hopefully, demonstrate how different groups developed different, but equally valid, approaches and solutions to the same problem). Following this, subsequent problems were to become more complex and involve a range of different types of output. One important decision was that student motivation to learn would be enhanced by allowing a choice of topic areas in which the problems were to be based. Beyond the first problem, students chose the topic areas for the remaining problems from within the indicative module content, and I then developed problems for each.

Developing suitable problems for PBL is challenging and Savin-Baden and Major (2004) suggest that students will be better motivated to learn if PBL begins with a

problem about which they will have some knowledge. They also state the importance of providing a statement or question at the end of the problem and of striking a balance between the problem being too narrow and being over-complex.

The first problem incorporated the application of memory theories to advertising and the historical context of the measurement of advertising effectiveness.

Neame and Powis (1981) suggest that a PBL curriculum should involve a gradual reduction of imposed structure, so that students are presented with more precise and explicit objectives in the earlier stages, along with more directive materials. In light of this, I decided to present the expected learning issues with the first problem, along with some suggested reading as a starting point. Once students had become accustomed to the PBL way of working, subsequent problems would require them to identify the learning issues and resources for themselves. The problem was designed to:

- Allow students to apply existing knowledge (they had all previously studied memory theories).
- Contain concepts with which students would be unfamiliar (e.g. memory-based measures of advertising effectiveness).
- Provide some structure to enable students to begin the PBL process (by the presentation of learning issues).

The problem scenario as developed for the first part of the module is shown below.

> You have been asked to produce a report about the contribution of psychology to understanding and measuring advertising effectiveness. The report is intended for an audience of advertising executives, who feel that advertising has lost its way over the years, particularly when it comes to how to measure the effectiveness of adverts using memory-based measures. Before they make any further major investments in measuring advertising effectiveness, they would like a fuller understanding, especially as there are some disagreements within the group.
>
> Some of the group would like to see a return to the 'good old days' of advertising research. They think that the psychological research conducted up until the late 1930s provided good insight into the way that memory for adverts works, and that knowledge in this area has not really advanced much since then.
>
> Some members of the group believe that the best way of measuring advert effectiveness is through the use of recall measures, while some argue that recognition measures are most effective.
>
> Prepare a short, informal, presentation setting out your advice for the advertising executives.
>
> **Learning Issues**
>
> 1. Has advertising 'lost its way'? How can this be determined?
> 2. Are memory-based measures the best way of measuring advertising effectiveness?
> 3. What did the early research in the 1930s say about memory and advertising?
> 4. Is this different from what is said today?
> 5. What does the evidence say about recall vs. recognition, and is this the right question?
> 6. What are 'recall' and 'recognition' in this context?

Students were introduced to the 'Seven Steps' to PBL (Nuutila, Törmä & Malmi, 2005; Schmidt, 1983; Schmidt & Bouhijs, 1980; Schultz & Christensen, 2004) and encouraged to work systematically in their activities. The Seven Steps approach emphasises the cyclical nature of the PBL process, and is summarised by de Graaff and Kolmos (2003) as: (1) Clarify the concepts; (2) Define the problem; (3) Analyse the problem; (4) Find the explanation; (5) Formulate the learning objective; (6) Search for further information; and (7) Report and test new information.

Assessment

There are at least four elements that are assessable in PBL: (1) Subject knowledge and understanding; (2) skill development; (3) teamwork; and (4) attitude change (i.e. attitude to knowledge as being constructed and contestable). There is a distinction in PBL between assessing the outcome and assessing the process (Savin-Baden, 2003; Savin-Baden & Major, 2004; Swanson, Case & van der Vleuten, 1998). Assessing the learning process is challenging, particularly in relation to making judgements about the effectiveness of the group. The role of the tutor as a facilitator can produce a conflict with the role of the 'assessor' if students feel that the tutor is largely 'surveilling' them during discussions and grading them on what they say and do (Savin-Baden & Major, 2004). This could undermine students as they begin to develop confidence in an unfamiliar and challenging way of working. Deretchin (2002) states the problem of assessing the process quite succinctly: '…how could I assess students individually on a group process when there is no prescribed content and where the success of the group lies beyond the control of any individual student?' (p.115). This point also ties in with the issue of whether to assess individuals or the group as a whole.

Although PBL is a group-based activity, there are issues around the use of group-based assessments, particularly in a Level 6 module. As Savin-Baden (2003) points out: '…because we do not trust our students to be adult learners who are committed and motivated, we tend to assess problem based learning teams. The reasoning here is to ensure attendance and commitment to the team. Some may see this as laudable, but it sits poorly with the philosophy of problem-based learning that promotes personal responsibility and autonomy' (p.107). Savin-Baden does, however, suggest that group-based and individual assessments can be combined using a 'tripartite assessment' in which the group submits a report, each individual submits the work that they have researched as well as an account of the team process. The advantages of this type of approach are that students who made the greater and more valuable contribution in terms of researching the area will receive higher marks than those who did less work. There are, however, some potential problems here. Firstly, as all students in the group will have all of the information gathered by all of its members, it may be difficult to authenticate an individual student's claimed contribution in their individual submission. Secondly, there remain potential issues with all students receiving the same mark for the report which, in all likelihood, would be written by the academically strongest student in the group. Indeed, such a student may not wish to be 'pulled down' by having others write any part of the report. There may, ultimately, be a mutually beneficial agreement on the part of the students in the group to allow the academically strongest student to produce the report. Fundamentally, Level 6 students may not feel that being assessed as a group is the fairest or most effective way for them to achieve the best outcome for them as individuals. Interestingly, though, Hutchings (2006) reports an approach in which groups are given the choice of whether to be assessed as individuals or as a group. If the former, they each make their own individual contribution to output (which could be written or oral).

As PBL was originally devised as a teaching method to emulate professional practice (in medicine), much of the published discussion of assessment issues in PBL concerns the application of learning in the professional context. I decided, however, that I would focus on the potential benefits of PBL in establishing deep learning and the acquisition and retention of knowledge and comprehension in the context of an academic module. Although PBL can lead to the development and enhancement of transferable skills such as team-working, I decided that these would not be directly assessed.

The rationale for selecting a written examination as the summative assessment

method was based on consideration of relevant literature in the area of PBL, as well as more general literature. For example, Macdonald and Savin-Baden (2004) suggest that assessment in PBL should, ideally, be based in a practice context in which students will work in the future, and what should be assessed is what the professional does in their practice. Similarly, Macdonald (2005) points out that assessment has traditionally been concerned with 'finding out how much students know, usually in terms of knowledge or content… in enquiry and problem-based learning, what we are really interested in is the students' ability to perform in a professional context, to recognise their need to acquire new knowledge and skills' (p.87). While this may be the aim of traditional PBL, it is apparent that the approach can be used to establish knowledge, understanding and critical thinking, and that these can be assessed using 'traditional' methods. This also, incidentally, allowed direct comparison of student performance with that achieved in the pre-PBL version of the module.

Written examinations are efficient, reliable, relatively plagiarism-proof and easy to moderate (Bone, 1999). They place the same demands on all students, and so are 'demonstrably fair' (Race, 2007, p.38). Examinations cause students to engage with learning (Race, 2007), although this may often be when the examination is imminent rather than encourage an ongoing and authentic learning.

Written examinations do, however, have some potential disadvantages. For example, while Swanson, Case and van der Vleuten (1997) state that 'essay exams are a popular choice for assessment in problem-based curricula' (p.275), they also raise concerns about the sampling breadth of this type of assessment, as a limited range of the material from the topics covered in the module would be covered. Thus, while essay-style exams provide 'very accurate information about students' understanding of the topics actually included' (Swanson et al., 1997, p.276), this will only be a small sample of the broader domain. This particular issue would not be problematic for Psychology and Advertising, however, as students would cover a limited range of topic areas and would have the opportunity to demonstrate their learning in relation to all of them in a written essay-style examination.

The exam questions were designed to be short and not too specific. Short questions rather than extended problem-style questions were used in order to reduce the potential effects of anxiety that students may experience under exam conditions and to enable them to demonstrate the learning that had taken place during the module. Ensuring that the questions were fairly open meant that students would not be disadvantaged if their group PBL activities had led them in a creative and unpredictable direction. A typical exam question (relating to the first problem described earlier) was:

> Provide evidence-based advice to an advertising agency on the value of using memory-based measures of advertising effectiveness.

Formative assessment was incorporated throughout the module in the form of the outputs from the problems. Student learning was monitored and feedback provided during, and at the completion of, each of the problems. This would include encouraging student reflection on the learning process in order to enable them to develop more effective ways of working for subsequent problems. Outputs included group presentations, written 'executive summaries' and the checking and editing of a Wikipedia page in the appropriate area.

The PBL process from the tutor's point of view

After a hesitant start, students have quickly engaged with the learning issues and have got on with tackling the problems. They used the seven-step process to guide them and drew on existing knowledge (they had all previously studied memory) and identified gaps (e.g. their unfamiliarity with research findings and literature in advertising).

Groups organised themselves effectively, developed their own ground-rules, and tackled the problems from different perspectives.

I was expecting to find it challenging to facilitate rather than 'teach', as the literature is abundant with warnings and advice. I was prepared to ask questions early on in the process and to make questions open-ended, to offer few ideas and avoid evaluative comments, other than to occasionally identify a learning issue (Hmelo-Silver & Barrows, 2008; Azer, 2005). I was determined to provide enough leadership without being over-directive or dominating (Azer, 2005; McLean, 2003; Papinczak, Tunny & Young, 2009), and to try to adopt a strategy of summarising, returning and deflecting questions, suggesting alternatives, monitoring progress and reflecting back (Savin-Baden & Major, 2004). I was also aware that non-directive tutors can appear to students to be disinterested or unenthusiastic (McLean, 2003), and that I needed to be alert to the difficulties that students would face in the transition to PBL (for instance, early on in the module, students seem to suspect that I am looking for a specific 'correct answer' based on a particular set of evidence that I am not disclosing to them).

What I was not expecting, however, was the extent to which the students were able to define my role for me. I have not been tempted to be too directive, simply because students have very rarely sought this from me. Students seem to prefer to direct their own learning and I did, at first, find this challenging. When introducing PBL for the first time, one simply does not know what the outcomes are going to be, so it is difficult to step back for the fear of it all 'going wrong'. As the experience becomes more familiar, it is easier to accept that 'back-seat' role with some confidence that the processes, end products and outcomes in terms of student learning and attainment will be good without students having to be directed and 'taught'.

Savin-Baden (2003) cautions that the 'challenges and costs of being a facilitator in problem-based learning are seldom acknowledged' (p.35) and I would emphasise that these should not be under-estimated. The shift from the role of 'knowledge provider' to 'facilitator' may be uncomfortable, or even unacceptable, to tutors who perceive their role to be that of transferring their knowledge and beliefs directly to students.

Student feedback

The module has now run twice using the PBL model. Students have been very positive about the PBL experience and value it as a useful and different way of learning. There have, inevitably and understandably, been some suggestions that reflect a difficulty in adapting to a new way of working. For example, there has been some suggestion that a reading pack might have been useful, but this would have moved the module back into the more prescriptive approach that I was striving to replace. Inevitably, there were some issues with group work (e.g. students not attending or not contributing fully), but these have been neither prevalent nor major.

One or two students would prefer not to have exams, but the majority feel that the assessment method is appropriate for the module.

Tellingly, the evaluations, as well as comments made during the module, reflect that students feel that they are learning as they go along, and that this feels very different to them from their typical practice of being passive learners who then 'revise' the lecture material when an exam is imminent.

Student performance

Performance on the written exams has been excellent in each of the first two years of the PBL delivery. Students write authoritatively and with insight and are able to demonstrate, with some aplomb, that they had achieved the module learning outcomes and, crucially, that they have actually demon-

strated knowledge and critical understanding.

The marks speak for themselves: Over the first four years of the module's existence, the mean mark was 56 per cent, with 38 per cent of students achieving a 2.1 grade or higher. In the first two years of PBL being incorporated in the module, the mean mark has been 65 per cent, with over 80 per cent of students achieving a 2.1 grade or higher. While percentage grades are not, of course, an end in their own right, it is the sheer quality of the student work that these marks reflect that is impressive.

Conclusions

PBL can be used in academic psychology modules as a vehicle for the development of psychological knowledge and understanding. The authentic learning that this type of approach engenders, lends itself to forms of assessment that focus on knowledge and understanding, as opposed to traditional PBL assessment forms that may focus on process as well as, or instead of, the end product.

It should be noted, though, the PBL will not necessarily provide a good fit for all types of psychology module at all levels. Where, for example, it is considered necessary to cover a broad syllabus, the time-consuming nature of PBL makes it much more difficult to achieve this, especially if a 100 per cent PBL approach is taken. Students need the time to explore whatever information base they feel is appropriate for their approach to the problem.

Interestingly, the contrast between PBL and more traditional didactic approaches to teaching and learning can work to an advantage. Although, as explained earlier, if a module includes both lectures and more student-led active learning, students wish to have more of the former and less of the latter, if a module is entirely PBL, as I have found, it provides a positive contrast and something different from the more traditional approaches employed in other modules.

In conclusion, PBL can have some extremely positive effects and can be used effectively in conjunction with methods of assessment that might initially appear to be incongruent with traditional PBL approaches. While careful consideration is needed about where and how PBL can be used in a psychology curriculum, I would suggest that it is a consideration worth making.

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